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**(54) SCREEN FOR USE IN A VIBRATORY FILTRATION EQUIPMENT**

SIEB ZUR VERWENDUNG IN EINER VIBRIERENDEN SIEBVORRICHTUNG

TAMIS POUR USAGE DANS UN DISPOSITIF DE FILTRATION VIBRANT

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## Description

### Field of invention

**[0001]** This invention concerns screens of the type disclosed in UK Patent Specification GB 2,322,590 and GB 2,292,533 and to a method and device for joining such screens end to end.

### Background

**[0002]** Screens of the type described such as shown in GB 2,322,590 and GB 2,292,533, have been provided with male and female edge formations at the ends of the screen frames, for the purpose of sealing the joint and to accommodate angular orientation of one screen relative to another when fitted within a shaker or sifting machine. However, none of the joints reliably connect one screen to the other to enable the two screens to be handled as one, when joined together and located in a frame support structure of such a machine.

**[0003]** It is an object of the present invention to provide for such a connection between the front edge of a rear screen and the rear edge of a front screen when mounted one behind the other in a shaker or sifting machine.

### Summary of the invention

**[0004]** According to the present invention there is provided a screen for use as a filter in a vibratory filtration equipment as characterised in claim 1.

**[0005]** The invention also lies in a screen as aforesaid when fitted to an adjoining similar screen wherein the engagement of one profile by another also serves to close the gap between the two screen frames and prevent at least particulate material from passing therebetween.

**[0006]** Preferably the engagement of the two profiles is adapted to prevent liquid from passing therebetween.

**[0007]** Typically when fitted in a support structure in a shaker or sifting machine, the combination of a screen as aforesaid, together with a second similar screen, are arranged in tandem, one behind the other, the inner one constituting the rear screen and the other the front screen of a pair when viewed from the front of the machine.

**[0008]** In such an arrangement the two screens may be in generally planar alignment.

**[0009]** In some applications the support structure may be adapted so as to cause one screen to be angled relative to the plane of the other.

**[0010]** Whether aligned in one plane or angled, the engagement of the channel profiles provides a reliable force-transmitting connection to enable a rear screen to be removed from the support structure simply by pulling out the front screen of the pair.

**[0011]** A support structure for such a pair of screens typically comprises parallel rails for supporting left and right hand edges of the two screen frames, a transversely extending rear ledge for supporting the far end of the rear

screen frame, and an inflatable rim seal which when inflated and pressurised firmly sandwiches the edges of the frames between the inflated seal and the rails and the ledge so as to prevent any movement of the frames in the support structure once the seal is inflated, but which when deflated permits movement of the screens relative to the rails for movement in and out of the support structure and also vertical movement of one frame relative to the other, to facilitate the entry of one profile into the other to effect the said engagement with the two screens in the support structure and the invention lies in a support structure as aforesaid when fitted with two such screens.

**[0012]** A method of joining two screens as aforesaid in a support structure which comprises parallel rails for supporting left and right hand edges of the two screens and a transversely extending rear ledge for supporting the far end of the rear screen, and an inflatable rim seal which when inflated and pressurised firmly sandwiches the edges of the screens between the inflated seal and the rails and the ledge so as to prevent any movement of the screens in the support structure once the seal is inflated, but which when deflated permits movement of the screens relative to the rails for movement in and out of the support structure and also vertical movement of one screen relative to the other, comprising the steps of lifting up the end of the screen provided with the downwardly open profile within the support structure relative to the upwardly open profile provided at the end of the other screen, and allowing the downwardly open profile to pass up and over the inclined face of the upwardly open profile and thereafter to drop into and engage the channel thereof to effect the engagement.

**[0013]** The two screens may be slid one after the other into the support structure with the first to be slid into position being arranged with its upwardly open profile at its trailing end.

**[0014]** Preferably the second screen to be pushed into the support structure is inserted until its leading end profile abuts the rear end of the first screen, the external shape of the profiles being adapted to cause the leading end profile of the second screen to rise up and over the inclined face on the rear end of the first screen with continued forward movement of the second screen.

**[0015]** Although the male/female engagement of the edges of the screens described in GB 2,322,590 and GB 2,292,533 provided a degree of interference as between one screen and the next when in line, the engagement of these screen edges did not provide a reliable force-transmitting connection such as has been found to be necessary to allow a rear screen to be pulled out simply by pulling out the front screen of a pair, especially after use, when both screens are heavily encrusted with mud and especially the rear one may be very resistant to sliding movement.

**[0016]** As stated, the screens may be located in a support structure comprising parallel rails for supporting the left and right hand edges of the screens and a transversely extending rear ledge for supporting the far end of the

rear screen, and an inflatable rim seal is provided which when pressurised firmly sandwiches the edges of the screens between the inflated seal and the rails and the ledge. Once inflated, the squeeze exerted on the frame edges prevents any movement of the screens. However once deflated, both screens are not only capable of being slid along the rails but are also capable of limited relative vertical movement. It is this latter degree of freedom which renders the engagement shown in the earlier Patent Specifications insufficient to provide a reliable traction connection to be provided between the two screens.

**[0017]** Likewise this relative vertical movement, which is possible when the seal is deflated, may be employed as already described to assist in joining the edges of a pair of screen frames embodying the invention, to permit one frame to be lifted relative to the other to allow its outboard downwardly extending edge profile lip to be lifted over the corresponding but upwardly extending edge profile lip at the adjoining end of the other frame, thereafter to be dropped thereinto to effect the join.

**[0018]** Of course, once the two edges are so engaged, the two screens are positively joined together and sliding movement of one, in a direction perpendicular to the join, will be reliably transmitted to the other, so that the two will move as one. As already described the rear frame therefore can be pulled out simply by pulling the front frame. Once the latter is clear of the support assembly within the chamber, the edge profile of its rear end can be disengaged from the edge profile along the front edge of the rear screen. The latter is then available to be pulled out by gripping it along its front leading edge, and pulling.

**[0019]** The invention will now be described by way of example with reference to the accompanying drawings, in which:-

Fig 1 is a plan view of a screen frame,

Fig 2 is a section on line AA of Fig 1,

Fig 3 is a section on line BB of Fig 1,

Fig 4 is a cross-section through the edge profile of the front (outboard when fitted) edge (left hand end) of the screen of Fig 1, and

Fig 5 is a cross-section through the edge profile of the rear (inboard when fitted) edge (left hand end) of the screen of Fig 1.

#### Description of Figures

**[0020]** In Fig 1 a screen similar to that described in relation to the drawings in UK Patent 2,322,590 is shown in plan view from above. The screen is comprises of a GRP frame 10 having an orthogonal array of ribs which divide the area bounded by the outer edges of the frame, into a plurality of rectangular similarly sizes windows such as 12. Although not shown, woven wire cloth is stretched

over the frame and bonded to the outer edges and the ribs in a manner such as described in UK Patent 2,322,590.

**[0021]** The frames will normally be arranged in tandem in a support assembly with the left hand end of the frame of Fig 1 abutting what would be the right hand end of a similar frame, ahead of it (i.e. to the left of the screen in Fig 1), in a support assembly. The latter includes two rails (not shown) which engage the undersides of the two longer edges 14, 16 (see Fig 2) of the frame, and a lip (also not shown) co-planar with the rails, which extends across the support assembly to support the underside 18 of the edge profile 20 along the rear edge of the innermost frame.

**[0022]** Generally a second pair of screens is arranged co-planar with, and to one side of, the first pair, supported in a similar manner on two parallel rails and a transverse rear lip. Filtering is achieved by pouring mud onto the area defined by all four screens, and shaking the support assembly while so doing, causing solids to migrate over the screens and liquid to pass through the woven wire cloth.

**[0023]** The junction between the two screens is formed by engaging the downwardly protruding lip 22 of the edge of one frame into the upwardly facing channel 24 of the edge profile along the adjoining edge of the other frame.

**[0024]** It will be seen that the underside 26 of the lip 22 is inclined at approximately 45° and the upper edge 28 of the lip 30 defining the channel 24 is similarly inclined at 45°, in a complementary fashion to the slope 26 on 22. In this way, provided upward vertical movement can occur of the frame having the edge carrying the downwardly protruding lip 22, sliding movement of the frame carrying lip 22 in a direction towards the edge of an aligned frame carrying the channel 24 will, when face 26 engages face 28, cause the frame carrying lip 22 to rise up due to the engagement of the two 45° inclined surfaces, until the lip 22 can drop into the channel 24, whereupon the two frames are securely joined edge to edge.

**[0025]** By ensuring that the lip 22 extends fully across the width of the frame (as seen at the right hand end of Fig 1) even if the co-operating female profile of lip 30 and channel 24 does not extend fully across the end of the other frame, (as shown at the left hand end of Fig 1), the lip 22 will act as a cover for the join, and this, and its engagement in the channel 24, will prevent any particulate material from passing through the join between the two edges.

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#### **Claims**

1. A screen for use as a filter in a vibratory filtration equipment, in which opposite ends of the screen are formed with corresponding profiles such that when two such screens are placed end-to-end they can be brought into interlocking engagement, the screen having a first end formed with an upwardly open

channel profile (30) and including an upwardly and outwardly directed inclined face (28), and a second opposite end formed with a corresponding downwardly open channel profile (22) and including a complementary downwardly and outwardly inclined face (26), whereby when placed end-to-end along a line of engagement with a second similar screen to which it is connectable, with the second end of the first screen abutting the first end of the second screen, a pushing together of the two screens in a direction generally perpendicular to the line of engagement and in the plane of at least one of the two screens, causes the screens to become firmly connected together to form a join along the line of engagement, **characterised in that** the upwardly open channel profile (30) has an upwardly open channel defined on its outer side by a first vertical edge surface which, at its uppermost end, adjoins the upper end of the inclined face (28) and the downwardly open channel profile (22) has a downwardly open channel defined on its outer side by a second vertical edge surface which, at its lowermost end, adjoins the lower end of the inclined face (26) so that pushing together of the two screens causes the downwardly inclined face (26) to engage the upwardly inclined face (28) and causes the first end of the second screen to slidingly rise up and then drop down until the two screens become firmly connected together with the first vertical edge surface confronting the second vertical edge surface and so that when one screen is pulled in a direction away from the other screen the two screens will reliably move as a single entity as a consequence of the first vertical edge surface engaging the second vertical edge surface.

2. A screen as claimed in claim 1 when fitted to an adjoining similar screen, wherein the channel profile of the second end of the screen comprises a lip (22) extending across the width of the two interlocking screens, which lip serves to close the gap between the screens and prevent at least particulate material from passing therebetween.
3. A combination of a screen as claimed in claim 1 or claim 2 when fitted in a support structure in a shaker or sifting machine, together with a second similar screen in tandem, one behind the other, the inner one constituting the rear screen and the other the front screen of a pair when viewed from the front of the machine.
4. A combination of two screens as claimed in claim 3 wherein the two screens are in generally planar alignment.
5. A combination as claimed in claim 3 wherein the support structure causes one screen to be angled relative to the plane of the other.

6. A combination as claimed in any one of claims 3 to 5 wherein the engagement of the channel profiles (22, 30) provides a reliable force-transmitting connection to enable a rear screen frame to be removed from the support structure simply by pulling out the front screen of the pair.
7. A combination as claimed in any one of claims 3 to 6 wherein the support structure comprises parallel rails for supporting left and right hand edges of the two screens, a transversely extending rear ledge for supporting the far end of the rear screen, and an inflatable rim seal which when inflated and pressurised firmly sandwiches the edges of the screens between the inflated seal and the rails and the ledge so as to prevent any movement of the screens in the support structure once the seal is inflated, but which when deflated permits movement of the screens relative to the rails for movement in and out of the support structure and also vertical movement of one screen relative to the other, to facilitate the entry of one profile into the other to effect the said engagement with the two screens in the support structure.

#### Patentansprüche

1. Sieb zur Verwendung als Filter in einer Vibrationsfiltriereinrichtung, bei dem die gegenüberliegenden Enden des Siebs mit übereinstimmenden Profilen ausgebildet sind, so dass sie, wenn zwei derartige Siebe Ende an Ende angeordnet sind, in einen Sperringriff gebracht werden können, wobei das Sieb ein erstes Ende aufweist, das durch ein nach oben offenes Kanalprofil (30) gebildet ist und eine nach oben und nach außen gerichtete, geneigte Fläche (28) umfasst, und ein zweites gegenüber angeordnetes Ende, das durch ein nach unten offenes Kanalprofil (22) gebildet ist und eine komplementär nach unten und nach außen geneigte Fläche (26) umfasst, so dass, wenn das Sieb Ende an Ende entlang einer Eingriffslinie mit einem zweiten, gleichartigen Sieb, mit dem es verbindbar ist, angeordnet ist, wobei das zweite Ende des ersten Siebs am ersten Ende des zweiten Siebs anliegt, ein Zusammenschieben der beiden Siebe in einer im Allgemeinen rechtwinkligen Richtung zur Eingriffslinie und in der Ebene zumindest eines der beiden Siebe bewirkt, dass die Siebe fest miteinander verbunden werden, um eine Verbindung entlang der Eingriffslinie zu bilden,  
**dadurch gekennzeichnet, dass**  
das nach oben offene Kanalprofil (30) einen nach oben offenen Kanal aufweist, der an seiner Außenseite durch eine erste vertikale Randfläche begrenzt ist, die an ihrem höchsten Ende an das obere Ende der geneigten Fläche (28) angrenzt, und das nach unten offene Kanalprofil (22) einen nach unten offe-

nen Kanal aufweist, der an seiner Außenseite durch eine zweite vertikale Randfläche begrenzt ist, die an ihrem untersten Ende an das untere Ende der geneigten Fläche (26) angrenzt, so dass das Zusammenschieben der beiden Siebe bewirkt, dass die nach unten geneigte Fläche (26) mit der nach oben geneigten Fläche (28) in Eingriff ist und dass das erste Ende des zweiten Siebs gleitend angehoben wird und dann herunterfällt, bis die beiden Siebe fest miteinander verbunden sind, so dass die erste vertikale Fläche der zweiten vertikalen Fläche gegenüberliegt, und so dass, wenn ein Sieb in eine Richtung weg von dem anderen Sieb gezogen wird, sich die beiden Siebe zuverlässig als eine Einheit bewegen als Folge, dass die erste vertikale Randfläche mit der zweiten vertikalen Randfläche im Eingriff ist.

2. Sieb gemäß Anspruch 1, wobei, wenn das Sieb mit einem angrenzenden, gleichartigen Sieb befestigt ist, das Kanalprofil des zweiten Endes des Siebs einen Rand (22) aufweist, der sich über die Breite der beiden ineinander eingreifenden Siebe erstreckt, wobei der Rand dazu dient, die Lücke zwischen den Sieben zu schließen und wenigstens zu verhindern, dass Feststoffe dazwischen hindurch treten.
3. Kombination eines Siebes gemäß Anspruch 1 oder Anspruch 2, wobei, wenn das Sieb in einer Haltekonstruktion in einer Schüttelvorrichtung oder Siebvorrichtung befestigt ist, zusammen mit einem zweiten, gleichartigen Sieb hintereinander, eines hinter dem anderen, das Innere das hintere Sieb und das andere das vordere Sieb eines Paares darstellt, wenn es von der Vorderseite der Maschine betrachtet wird.
4. Kombination von zwei Sieben gemäß Anspruch 3, wobei die beiden Siebe eine im Allgemeinen ebene Anordnung aufweisen.
5. Kombination gemäß Anspruch 3, wobei die Haltekonstruktion bewirkt, dass ein Sieb winklig bezüglich der Fläche des anderen Siebs angeordnet ist.
6. Kombination gemäß wenigstens einem der Ansprüche 3 bis 5, wobei der Eingriff der Kanalprofile (22, 30) eine zuverlässige, Kraft übertragende Verbindung bildet, um zu ermöglichen, dass ein Siebrahmen einfach durch Herausziehen des vorderen Siebs der beiden aus der Haltekonstruktion entfernt wird.
7. Kombination gemäß wenigstens einem der Ansprüche 3 bis 6, wobei die Haltekonstruktion parallele Schienen zum Halten der linken und rechten Ränder der beiden Siebe, einen sich schräg nach hinten erstreckenden Absatz zum Halten des anderen Endes des hinteren Siebs und eine aufblasbare Randdich-

tung umfasst, die, wenn sie aufgeblasen und mit Druck beaufschlagt ist, die Ränder der

## 5 Revendications

1. Tamis destiné à être utilisé en tant que filtre dans un dispositif de filtration vibrant, dans lequel des extrémités opposées du tamis sont formées avec des profils correspondants de sorte que lorsque deux de ces tamis sont placés bout à bout, et peuvent être amenés en mise en prise de blocage, le tamis ayant une première extrémité formée avec un profil de canal ouvert vers le haut (30) et comprenant une face inclinée dirigée vers le haut et vers l'extérieur (28), et une seconde extrémité opposée formée avec un profil de canal ouvert vers le bas (22) correspondant et comprenant une face complémentaire inclinée vers le bas et vers l'extérieur (26), moyennant quoi, lorsqu'ils sont placés bout à bout le long d'une ligne de mise en prise avec un second tamis similaire auquel il peut être raccordé, avec la seconde extrémité du premier tamis venant en butée contre la première extrémité du second tamis, une poussée des deux tamis dans une direction généralement perpendiculaire à la ligne de mise en prise et dans le plan d'au moins l'un des deux tamis, amène les tamis à être fermement raccordés pour former à un joint le long de la ligne de mise en prise, **caractérisé en ce que** le profil de canal ouvert vers le haut (30) a un canal ouvert vers le haut défini sur son côté externe par une première surface de bord vertical qui, au niveau de son extrémité la plus haute, est attenante de l'extrémité supérieure de la face inclinée (28) et le profil de canal ouvert vers le bas (22) a un canal ouvert vers le bas, défini sur son côté externe par une seconde surface de bord vertical qui, au niveau de son extrémité la plus basse, est attenante à l'extrémité inférieure de la face inclinée (26) de sorte que la poussée des deux tamis amène la face inclinée vers le bas (26) à mettre en prise la face inclinée vers le haut (28) et amène la première extrémité du second tamis à monter de manière coulissante et à tomber jusqu'à ce que les deux tamis soient fermement raccordés avec la première surface de bord vertical faisant face à la seconde surface de bord vertical et de sorte que lorsqu'un tamis est poussé dans une direction à distance d'un autre tamis, les deux tamis se déplacent de manière fiable comme une entité individuelle, en raison de la première surface de bord vertical qui met en prise la seconde surface de bord vertical.
2. Tamis selon la revendication 1, lorsqu'il est monté sur un tamis similaire attendant, dans lequel le profil de canal de la seconde extrémité du tamis comprend une lèvre (22) s'étendant sur la largeur des deux tamis bloqués, laquelle lèvre sert à fermer l'espace

situé entre les tamis et à empêcher au moins du matériau particulaire de passer entre eux.

3. Combinaison d'un tamis selon la revendication 1 ou la revendication 2, lorsqu'il est monté dans une structure de support dans un agitateur ou une machine à tamiser, conjointement à un second tamis similaire en tandem, l'un derrière l'autre, le tamis interne constituant le tamis arrière et l'autre, le tamis avant d'une paire lorsqu'elle est observée depuis l'avant de la machine. 5  
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4. Combinaison de deux tamis selon la revendication 3, dans laquelle les deux tamis sont en alignement généralement plan. 15
5. Combinaison selon la revendication 3, dans laquelle la structure de support amène un tamis à être incliné par rapport au plan de l'autre. 20
6. Combinaison selon l'une quelconque des revendications 3 à 5, dans laquelle la mise en prise des profils de canaux (22, 30) propose un raccordement de transmission de force fiable pour permettre de retirer un châssis de tamis arrière de la structure de support simplement en retirant le tamis avant de la paire. 25
7. Combinaison selon l'une quelconque des revendications 3 à 6, dans laquelle la structure de support comprend des rails parallèles pour supporter des bords gauche et droit des deux tamis, un rebord arrière s'étendant de manière transversale pour supporter l'extrémité éloignée du châssis arrière, et un joint de bord gonflable qui, lorsqu'il est gonflé et mis sous pression, prend fermement en sandwich les bords des tamis entre le joint gonflé et les rails et le rebord afin d'empêcher tout mouvement des tamis dans la structure de support une fois que le joint est gonflé, mais qui, lorsqu'il est dégonflé, permet le mouvement des tamis par rapport aux rails pour le mouvement à l'intérieur et à l'extérieur de la structure de support et également le mouvement vertical d'un tamis par rapport à l'autre, pour faciliter l'entrée d'un profil dans l'autre afin d'effectuer ladite mise en prise avec les deux tamis dans la structure de support. 30  
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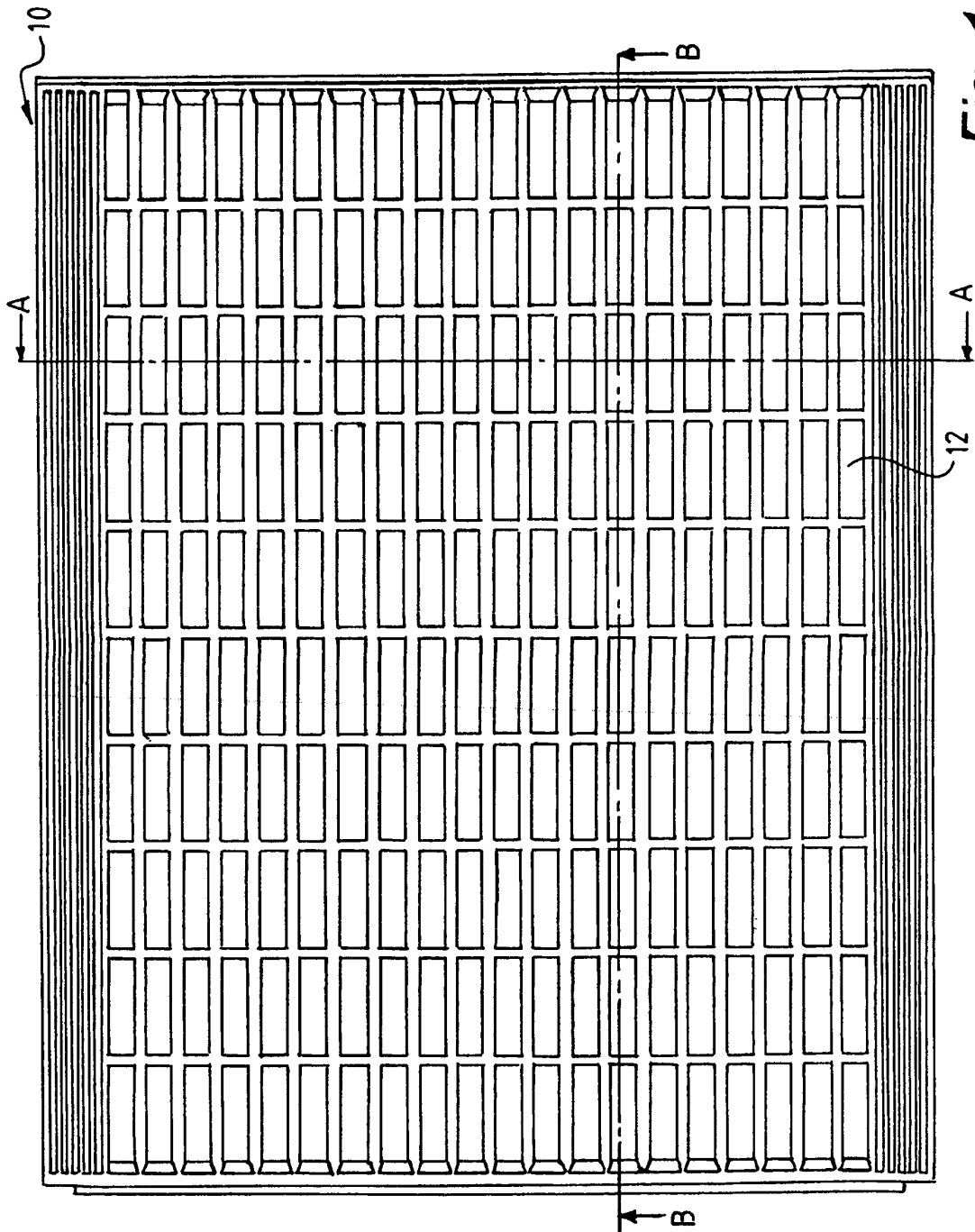
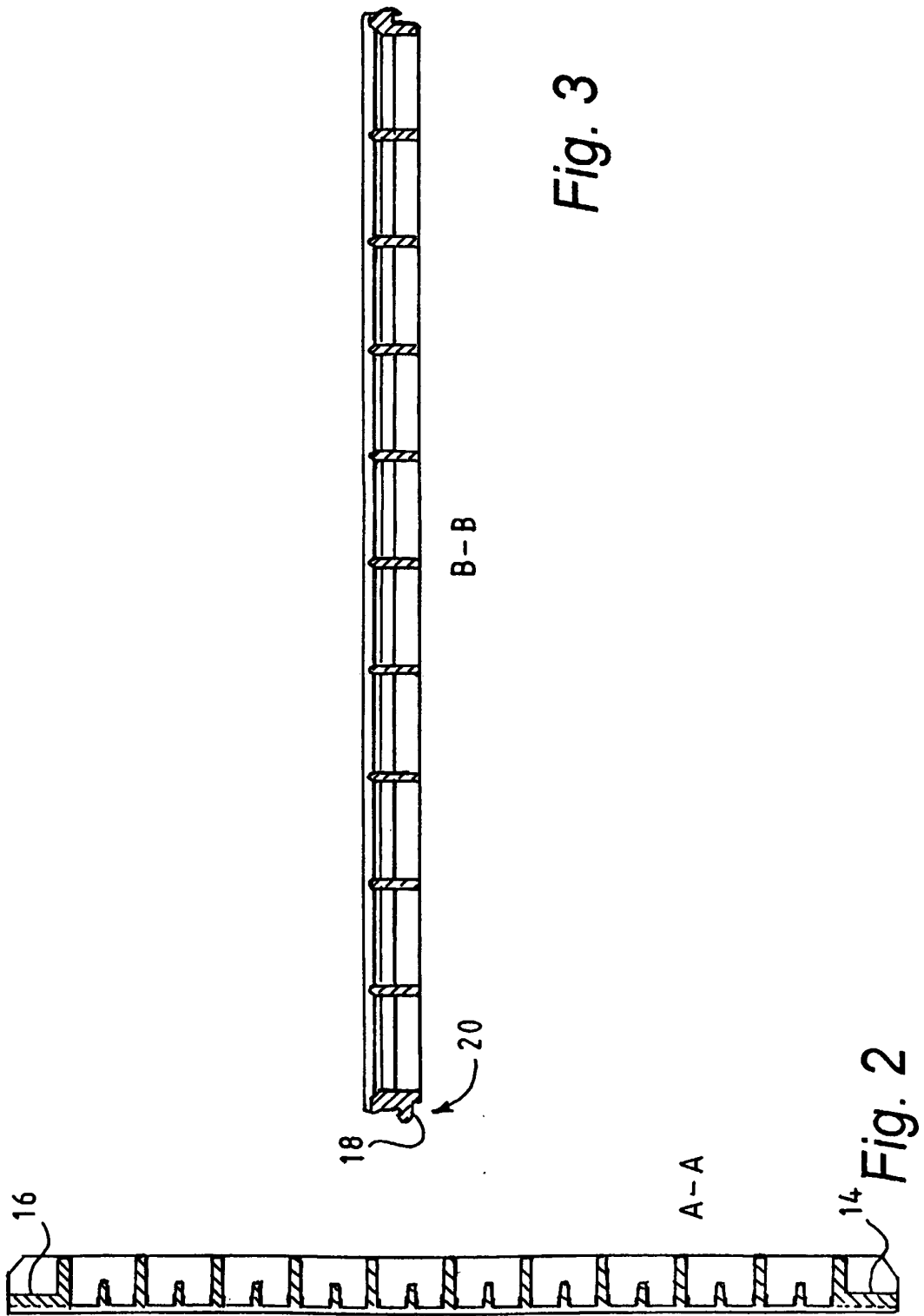
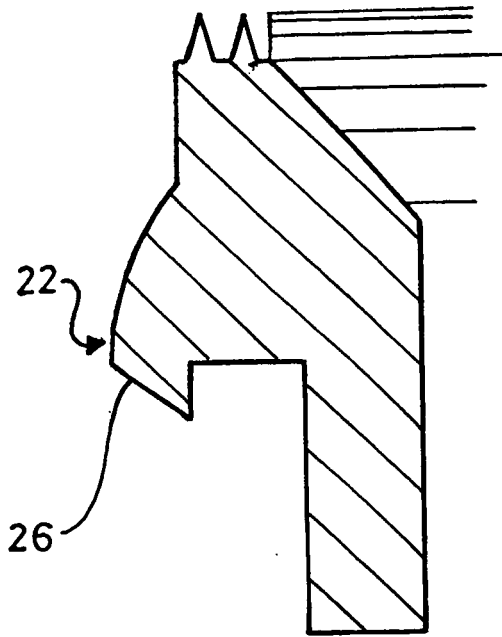
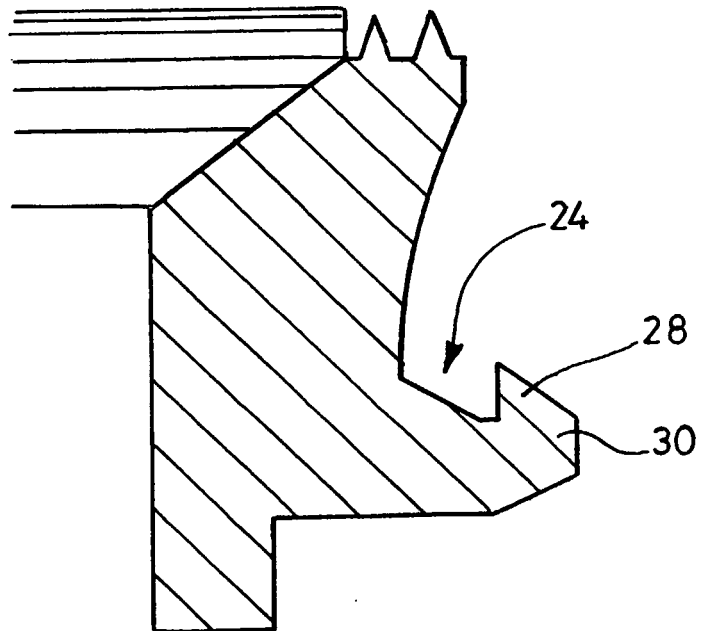


Fig. 1





*Fig. 4*



*Fig. 5*

**REFERENCES CITED IN THE DESCRIPTION**

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